Name:

at1124exam: Radicals and Squares (v0)

Question 1

Simplify the radical expressions.

$\sqrt{50}$ $\sqrt{27}$ $\sqrt{20}$

$\sqrt{5 \cdot 5 \cdot 2}$ $\sqrt{3 \cdot 3 \cdot 3}$ $\sqrt{2 \cdot 2 \cdot 5}$

$5\sqrt{2}$ $3\sqrt{3}$ $2\sqrt{5}$

Question 2

Find all solutions to the equation below:

$$3\left((x-6)^2+10\right) \;=\; 78$$

First, divide both sides by 3.

$$(x-6)^2+10=26$$

Then, subtract 10 from both sides.

$$(x-6)^2=16$$

Undo the squaring. Remember the plus-minus symbol.

$$x-6=\pm 4$$

Add 6 to both sides.

$$x=6\pm 4$$

So the two solutions are $x=10$ and $x=2$.

Question 3

By completing the square, find both solutions to the given equation. *You must show work for full credit!*

$$x^2 + 12x = 45$$

$$x^2 + 12x + 36 = 45 + 36$$
$$x^2 + 12x + 36 = 81$$
$$(x+6)^2 = 81$$
$$x + 6 = \pm 9$$
$$x = -6 \pm 9$$
$$x = 3 \quad \text{or} \quad x = -15$$

Question 4

Any quadratic function, with vertex at (h, k), can be expressed in vertex form:

$$y = a(x-h)^2 + k$$

A quadratic function is shown below in standard form.

$$y = 2x^2 - 20x + 41$$

Express the function in **vertex form** and identify the **location** of the vertex.

From the first two terms, factor out 2 .

$$y = 2(x^2 - 10x) + 41$$

We want a perfect square. Halve -10 and square the result to get 25 . Add and subtract that value inside the parentheses.

$$y = 2(x^2 - 10x + 25 - 25) + 41$$

Factor the perfect-square trinomial.

$$y = 2((x-5)^2 - 25) + 41$$

Distribute the 2.

$$y = 2(x-5)^2 - 50 + 41$$

Combine the constants to get **vertex form**:

$$y = 2(x-5)^2 - 9$$

The vertex is at point $(5, -9)$.